An introduction to Dangerous ideas in zoology

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ABSTRACT

Dangerous ideas are those that challenge the *status quo*, ignore political correctness or, if followed, lead to an unsettling series of consequences (Pinker 2006). As practising zoologists, our ongoing concern relates to the long-term survival of our native wildlife across all land tenures and the marine environment, and protecting natural areas in perpetuity. We hoped that a day of dangerous zoological ideas would stimulate fresh thinking and discussion about how to meet the challenges in using science to help conserve wildlife in the 21st century.

While we as editors have a view on what comprises a dangerous idea (and a solid zoological idea), we were most reluctant to circumscribe our speakers and their papers. As a consequence, the papers in this volume reveal a remarkable take on what is dangerous, or at least what is considered dangerous and by whom. Some authors pose dangerous new ideas to solve difficult zoological challenges, others highlighted dangers in the misinterpretation of science and make a call for change, while others revealed hidden dangers in zoological ideas that are popular with the public but are yet to be fully thought through. Collectively the papers in this volume reveal that within the discipline of zoology, the battleground of ideas is awash with tough contests. Here though, our focus is on understanding and conserving our native fauna and, to that end, the Royal Zoological Society of NSW is keen to be dangerous in a world locked more into economic growth than an appreciation of our natural heritage and how to conserve it.

Key words: extinction, science education, heresy, evolution, ecological theory, vegetarian.

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What is your view of a dangerous idea?

A dangerous idea is one that is not quite "right"- perhaps because it is an idea that's stuffing up science or conservation, or because it's an idea that ought not be discussed in polite zoological company, or because it's an idea that is not yet backed by well-replicated field experiments but you know it makes sense and could change things for the better. Dangerous ideas can be game changers, ones that challenge the *status quo*, and many zoological ideas that are innovative and inspired can at first seem a little crazy.

While planning the 2013 forum of the Royal Zoological Society of New South Wales (RZS NSW), we saw the need to highlight key issues challenging the conservation of Australia's unique fauna. Our initial predisposition as forum organisers and then editors was to expand the thesis of *Science under Siege* (Banks *et al.* 2012) and *Grumpy Scientists* (Lunney *et al.* 2013) with more examples, more emphasis and a greater sense of urgency. Ultimately, however, we thought of tackling the problem of conserving our fauna by taking a fresh perspective, namely to pick up on the theme of dangerous ideas. We viewed dangerous ideas as being those that challenge the *status quo*, ignore political correctness or, if followed, lead to an unsettling series of consequences (Pinker 2006). In parallel, that theme also captured the imagination of others, as seen in an advertising feature in the *Sydney Morning Herald* of 19-20 October 2013 entitled "Festival of dangerous ideas", or 'FODI'13', being held on 2-4 November 2013.

The FODI 13 festival curators, Ann Mossop and Simon Longstaff, wrote a piece entitled, "Freedom to think again", with the sub-title, "Time to switch off auto-pilot and jump into the dangerous deep-end". The penultimate sentence in their piece is a clear call to think again: "The power of dangerous ideas comes from their ability to make you see things with fresh eyes". The themes for FODI'13 were advertised as crime and punishment, technology and media, battle of the sexes, future of humanity, religion and life cycle. FODI'13 was held at the Opera House in expectation of a large, cosmopolitan audience for ideas that capture enduring questions that most people have thought about, have bumped into, or had imposed upon them. The RZS NSW forum on dangerous ideas, by contrast, was on zoology, and it overlapped with FODI'13 both in date (2 November 2013) and in spirit.

"Dangerous ideas in zoology" is a theme that fits the FODI'13 scope, but it is more specialised. The Australian Museum was an appropriate zoological venue. It is a natural history museum filled with zoological specimens, educational material and researchers (although the number of researchers waxes and wanes with economic conditions and local politics, Hutchings 2013). Zoology is a comparatively remote subject area, and most of the battles fought by zoologists for public attention reach only a small audience. Leaving aside the need for zoologists to better communicate the importance of our science, we argue that this audience should be larger, because the subject matter is of crucial, long-term relevance to all future generations, and there is thus an increasingly high level of responsibility for today's generation to acknowledge and act. Our current concern relates to the long-term survival of our native wildlife across all land tenures and the marine environment, and protecting natural areas in perpetuity. We figured that perhaps what Australian zoology and conservation needed was an injection of dangerous ideas that challenge old paradigms and see things with fresh eyes.

Science has always been a source of heresy

Pinker (2006), in his introduction to Brockman's (2006) engaging collection of essays under the title *What is your dangerous idea?,* considered that, 'when done right, science (along with other truth-seeking institutions, such as history and journalism) characterises the world as it is, without regard for whose feelings get hurt'. Pinker added that science has always been a source of heresy, and advances in areas such as genetics, evolution and environment throw up unsettling possibilities. As is apparent to any zoologist, these three themes are linked, and include, among others, genetic manipulation of life, e.g. cloning and genetically modified crops, and the way evolution is opposed by creationists - a subject dealt with deftly by Bridgstock (2012) and Brooks (2012) in *Science under siege* (Banks *et al.* 2012). From a biological viewpoint, genes, along with species and ecosystems, are part of the diversity of biology, and evolution is a critical concept in all biological thinking. Conserving biodiversity picks up all of these concepts, whether one is conserving and managing individual species, natural areas such as individual forests, or entire ecosystems, such as the Great Barrier Reef. At the level of science there is no intention to be particularly heretical, although the scale and ecological requirements to conserve biodiversity and environmental integrity are viewed by many people, if not most, as too demanding, i.e. a danger to economic growth, whether addressing climate change or recovering an endangered species. Consequently, there is an ethical dimension to conserving nature and there are alternate views that have legitimacy. The drastic solutions to curb the environmental losses loom on so many fronts from the Great Barrier Reef to the arid zone that the whole conservation agenda is, in the minds of many, a set of dangerous ideas that challenges the dominant economic model of achieving affluence. Hence the broad social, political and ethical context to conserving biodiversity. This forum and publication looks at dangerous ideas in zoology from all angles: those that challenge and advance the science; those that use the veil of science to promote damaging ideas; and, those that simply make you smile, while quietly contemplating "what if".

Dangerous ideas in zoology

While we as editors have a view on what comprises a dangerous idea (and a solid zoological idea), we were most reluctant to circumscribe our speakers and their papers. As a consequence, the papers in this volume reveal a remarkable take on what is dangerous, or at least what is considered dangerous and by whom.

Consider one example – the paper by Opit (2017). His paper: "Citizen Science and Cryptozoology, data received from listeners during 18 years of wildlife talkback on ABC North Coast New South Wales Local Radio", tests our perception of the world. Besides the 342 identifiable species, unusual reports were regularly received describing mammals unknown to Australian zoology. One referee's response was to dismiss the paper, the unknown mammals were cluttering serious zoology. *Prima facie*, we could readily agree, but we decided to accept the paper. To us, the issue was not so much that an extinct animal might reappear, or an exotic species would have slipped into the Australian bush and not be noticed except for a caller to the ABC, but that such perceptions of strange creatures are so common. For those who have undertaken a psychology course as an undergraduate, the term "thematic apperception test" would be familiar, and it has application to Opit's unknown mammals. The "thematic apperception test (TAT)" is a personality test in which a person's patterns of thought, attitudes, observational capacity, and emotional responses are evaluated on the basis of responses to ambiguous test materials.[1] Its original purpose was to reveal the underlying dynamics of the subject's personality, such as internal conflicts, dominant drives and interests, motives, etc. The TAT is widely used to research such topics in psychology as dreams, mate selection, the factors that motivate people's choice of occupations, and similar subjects. What Opit has done is to shine a light on the role of human personality in zoology, and one person's dangerous idea is just plain nonsense to another. The Opit example is relatively straightforward, either these creatures are in the bush or not. A thorough survey would confirm or dispel the suspicion. If the myth gains ground, and Chinese whispers amplify the myth, then we go from trivial bad science to something worse. But at the same time, ignoring information provided by the community can lead to scientist ignoring relevant information (Predavec *et al.* 2016).

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[1] http://legal-dictionary.thefreedictionary.com/Thematic+Apperception+Test, last accessed 14 May 2016.

Evolution has always been a dangerous idea for some and the rejection of evolutionary theory and the support of creationism is a perpetually vexatious topic. Calver and Bryant (2017) note that, although originating within fundamentalist Protestantism in the USA, creationist views are now prominent elsewhere and in other religions. Responses by educators include ignoring evolution, excluding evolutionary topics especially provocative to creationist students, advocating evolution while ignoring, disparaging or ridiculing creationism, distinguishing between scientific and religious approaches before considering only the scientific, and acknowledging evolution and creationist positions as different world views that one may understand, but not necessarily accept. Calver and Bryant argue that any chance of success in teaching evolution to creationist students requires elements of the last two of these approaches. Applying them requires understanding students' worldviews and the methods and limitations of science, as well as employing learning activities that engage, not alienate. Intuitively, or because they too took undergraduate psychology courses, Calver and Bryant have seen that some personalities have a different perception of the world, the animals they see, how to interpret evidence, or even see what others see and understand. The dangerous idea is not only Calver and Bryant's approach, risky perhaps in that is seems to yield to some extent by even giving passing acknowledgement to the creationist viewpoint, the intellectually lethal idea is creationism. The task of the teachers of evolutionary theory, such by as Calver and Bryant, is to see the psychological links and pursue a line of teaching that responds to personalities and deflect a dangerous rejection of science before it has taken hold. The consideration of an idea depends clearly on your viewpoint and the same idea can be both mainstream and dangerous.

Fleming and Ballard (2017) are working in the same zone, but offer a new perspective and posit that *Homo sapiens* is the apex animal: anthropocentrism as a Dionysian sword. Fleming and Ballard state that they believe that, while many studies deal with the consequences of human effects on ecosystems, the outcomes are viewed as if humans were observers rather than participants in ecosystems. Humans, they point out, are the apex animal, manipulating most ecosystems with forestry, mining, agriculture, manufacturing and urbanisation: we engineer the landscape, the air, the water and even the climate. They state that their objective is to discuss the roles of humans when designing experiments, proposing explanatory models and interpreting studies. Once again, the degree of danger lies in the perspective from which the idea is viewed.

Let us now move back into the more traditional world of science. Here we were astounded as to what is common sense to a good scientist is either not understood, or rejected, or there has been a flaw in society's science education, even of its scientists. Consider Ross and Poronnik's (2017) paper, Deficit and decline in Australian science; when shall we learn? where they identify that danger exists in using deficit and decline narratives that unsurprisingly have paralleled evidenced declines in research funding for Australian science. While surveys suggest a public lack of understanding of science, which is all too often diagnosed and remediated as "dumbness", Ross and Poronnik argue that Australians value science education. Scientists need to be careful, they caution, when they enter debates about the future direction of science curricula because of the danger in dichotomising the debate in which old pedagogies emerge as retrograde solutions. The deficit and decline narrative will continue to be a "dangerous solution" at a time in world history where our young people are more highly educated than ever before. They conclude that for Australia's future, we must foster a culture committed to more substantial funding of science research and better education of science teachers.

Given the higher level of education and the need for better education of science teachers, the powerful account by Adam (2017) on the misinterpretation, even misapplication, of science is a salutary reminder of the fallibility of those who seem to employ the tools of science. Adam asks, can ideas be dangerous? He then points out that science thrives on ideas, but interpretations of science and applications of misinterpretations in policies have potential to be dangerous to scientists, science itself, the broader society and the environment. Adam presents a number of examples of dangers from outside science and an extensive discussion of Gammage's *Biggest Estate*, and here the role of the critical scientist is prominently displayed. While Paul Adam has won the prize for the longest paper, he has dazzlingly shown how difficult it is to see the errors in the thinking and, it seems to us, the prejudice in others. We value such scholarship as shown by Adam and urge others not to shy away from such ecological investigations.

Smith and Banks (2017) present a concerning case of Chinese whispers emerging from within the scientific lieterature where they show that incorrect or ambiguous citations can easily lead to ideas being distorted in subsequent publications. Incorrect ideas are dangerous ideas if they become unfairly favoured because of the apparent supporting literature, and lead to misguided research or management action. By tracing a specific example—the impacts of black rats *Rattus rattus* on Australian mammals— they demonstrate how ambiguous or incorrect citations may have led to the development of distorted evidence for impact of rat predation on mammals for which there is in fact very little empirical support.

What is striking about calling for papers on dangerous ideas is the range of the responses. Our attention was drawn to a subject of great interest to zoologists – extinction, or an offshoot- de-extinction - yet one in which the humanities scholars have developed a viewpoint that challenges the zoological approach. Readers can see the expanding horizon of the subject of de-extinction. van Dooren and Rose (2017), under the hypnotic title, "Keeping Faith with the Dead: Mourning and De-extinction", take a critical perspective on the emerging prospect of 'de-extinction' as a response to the current period of massive biodiversity loss. They draw on their own humanities and social sciences research into the complex cultural contexts in which conservation and extinction take place, and question some of the underlying philosophical premises of de-extinction projects, their potential to undermine existing relationships between conservationists and local communities and their capacity to elide the more significant issues of the complexity of human involvement in all this death. This paper presents a window for zoologists on a wide range of scholarship in the environmental humanities. Banks and Hochuli (2017), as zoologists, also argue a strong, if controversial, view in their paper on extinction that conservation needs extinction. They argue that extinct species are martyrs or rallying points for the conservation cause. They highlight the preeminent role that the extinction of the thylacine *Thylacinus cynocephalus* plays in the narrative of a conservation imperative in Australia because it symbolizes the damage overexploitation by humans can cause. Banks and Hochuli (2017) question what conservation will be without such icons and rallying points, making the concept of extinction a dangerous one for conservation because it will lead to dangerous consequences.

When social opinions differ within the wider community, then there should be no surprise that this finds expression within zoology, especially where zoology appears in the public arena. Lunney (2017a,b) presents the case that conserving all our native fauna is an alluring idea, but dangerous in its application. Of note is that a great many species that are unique to Australia, and of world significance, such as the platypus *Ornithorhynchus anatinus*, are not included on the state and commonwealth lists of threatened species. The case is remade regularly, he points out, to extend current nature conservation programs, but the clashes with other values, principally the pursuit of a higher Gross Domestic Product, i.e. wealth in dollars, become so great that the practice of biodiversity conservation becomes increasingly dangerous to those promoting economic growth. Lunney argues that we need to see that our happiness includes conserving our natural legacy, yet it is a dangerous idea. If it were not dangerous, it would be taken up far more readily than it has been.

Equally demanding of our desire for consistency is the tension over being vegetarian. Wallis (2017) addresses the question: "Is vegetarianism bad for the environment?" No shrinking violet, Wallis challenges Mike Archer's Conversation 2011 piece entitled "Ordering the vegetarian meal? There's more animal blood on your hands". Archer argued that "if you want to minimise animal suffering and promote more sustainable agriculture, adopting a vegetarian diet might be the worst possible thing you could do." Wallis points out that Archer claims that if we stop eating grazing animals and turn to a vegetarian diet then we will need to farm an additional area the size of Victoria plus Tasmania to meet our nutritional needs. The logic, argues Wallis, is wrong – dangerously wrong! A largely vegetarian diet, Wallis claims, makes environmental sense while also offering health benefits. This paper wades knowingly into dangerous waters.

If we turn now to the discipline of zoology, the battleground of ideas is awash with tough contests. Consider Krebs' (2017) paper entitled: "10 Possible Limitations of Current Ecological Theory". The key focus is on the scientific maturity of our approaches, and the constraints that flow from pretending we are physicists, that progress will come from more mathematical models, and that generality will flow from short-term studies. All of my observations may be incorrect, says Krebs modestly, but they might generate some useful discussion about dangerous ideas on where ecology is headed. If mathematical models and short term studies are your preferred science mode, Krebs will have much relevance, and it is our view that funding bodies should pay considerable attention to his views gained from over five decades of experience.

Burgin (2017) tackles a point that may be obvious to biologists, but in practice, in the wider conservation community, it is dangerous to ignore, and that is the role of genetics in biodiversity restoration. Her argument runs as follows: the broader community has embraced the term 'biodiversity' and it has become a proxy for species conservation. As a consequence, conservation of biodiversity has effectively become the only approach to minimising continued species loss. In Australia, much of the biodiversity conservation/restoration is community-driven (e.g., landcare, political pressure of animal welfare groups) with a focus on species and habitat biodiversity. Genetic diversity is seldom seriously considered. As a consequence, native species biodiversity management is often not maximising the potential outcomes. To better manage biodiversity restoration all of us who use the term within our discipline need to ensure that, wherever possible, we seek to inform those around us of the importance of genetic biodiversity in biodiversity restoration programs.

Again, on conservation, Faith (2017) produces a startling thesis that ecosystem services can promote conservation over conversion and protect local biodiversity, but these local win-wins can be a regional disaster. Faith shows that, even when all local biodiversity is protected whenever ecosystem services values create greater benefits from conservation compared to conversion, it may lead to poor outcomes for regional biodiversity conservation. However, as we increase the estimated value of ecosystem services in localities, the region reaches a tipping point where the capacity for good regional biodiversity outcomes collapses. Recent proposals for spatial planning that continue to focus only on local win-win outcomes highlight the disregard for planning lessons forged 20 years ago in NSW.

Sparkes *et al.* (2017) tackle the tough topic of the social, conservation and economic implications of rabies in Australia. Australians, they consider, are particularly fond of wildlife and, consequently, our fauna are key to our national image. Unfortunately, they say, the relationship between Australians and our wildlife could change significantly. They discuss Australia's impending future with particular regard to how canine rabies could change our lives, the impacts it could have on wildlife conservation and the steps we must take to be prepared.

As editors, we have summarised one point of view in our synthesis of the papers. The subject is wide open to other views. We have tackled the topic of dangerous ideas in zoology as an outlet for creative thinkers to express new, challenging opinions. We could possibly run this forum every year, but that is not our aim, rather, it is to present the idea that ideas themselves that are dangerous and can come in many different forms, on diverse topics and some may not even seem dangerous at first glance. We did not explore the thesis that non-dangerous ideas are an impediment to science, but it could be canvassed. We are more interested in understanding and conserving our native fauna, and to that end, the RZS NSW is keen to be dangerous in a world locked more into economic growth than an appreciation of our natural heritage and how to conserve it.

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